Automated Methods For Distinguishing Copies from Original Printed Objects

Abstract of the Disclosure

This disclosure describes methods for using embedded auxiliary signals in documents for copy detection and other applications. In on application, the auxiliary signal is formed as an array of elements selected from a set of print structures with properties that change differently in response to copy operations. These changes in properties of the print structures that carry the embedded auxiliary signal are automatically detectable. For example, the changes make the embedded auxiliary signal more or less detectable. The extent to which the auxiliary data is detected forms a detection metric used in combination with one or more other metrics to differentiate copies from originals. Examples of sets of properties of the print structures that change differently in response to copy operations include sets of colors (including different types of inks), sets of screens or dot structures that have varying dot gain, sets of structures with different aliasing effects, etc. Robust and fragile watermarks are used in Image Replacement Documents for a variety of applications. Digital watermarks act as on-board mediators in authentication of a variety of printed documents. Finally, digital watermarks are used to help manage quality of the scanners used in imaging systems.